

AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A dry pump comprising:

a stator housing first and second intermeshing rotors adapted for counter-rotation within the stator, the rotors being mounted on their respective shafts rotatably supported by a bearing assembly; and

means for effecting axial movement of the rotors within the stator to vary at least one clearance between the rotors and the stator during use of the pump, wherein the means drives the bearing assembly in a manner where the first and second rotors always move in sync without any relative movement therebetween in an axial direction.

2. (Previously Presented) The pump according to claim 1 wherein the means for effecting axial movement of the rotors is configured to effect axial movement of the rotors in response to an axial load generated in the rotors during operation of the pump.

3. (Cancelled)

4. (Cancelled)

5. (Withdrawn) The pump according to claim 4 wherein the bearing assembly is free to move in an axial direction within a housing, and the means for effecting axial movement of the rotors comprises a spring mechanism arranged with respect to a rotor

such that when the rotor is subjected to an axial load, the spring mechanism compresses or extends causing an axial reactive load, so as to vary an axial position of the rotor over time.

6. (Withdrawn) The pump according to claim 5 wherein the spring mechanism comprises a setting spring positioned in the housing between the bearing assembly and an end surface of the housing.

7. (Withdrawn) The pump according to claim 5 wherein the housing is a cylindrical housing having an end surface extending radially inwardly toward the rotor.

8. (Withdrawn) The pump according to claim 5 wherein the spring mechanism is selected such that the maximum axial load to which a rotor is subjected does not exceed the elastic limit of the spring mechanism.

9. (Previously Presented) The pump according to claim 1 comprising control means for actively controlling operation of the means for effecting axial movement of the rotors.

10. (Previously Presented) The pump according to claim 9 wherein the means for effecting axial movement of the rotors comprises an actuator, and the control means is configured to control actuation of the actuator and thereby control the axial position of the rotors.

11. (Cancelled)

12. (Currently Amended) The pump according to claim 10 wherein the means for effecting axial movement of the rotors comprises a motor for rotating a drive shaft engaging the actuator, and the control means is configured to control operation of the motor so as to axially move the actuator relative to the stator ~~with~~ by rotation of the drive shaft.

13. (Previously Presented) The pump according to claim 12 wherein the drive shaft comprises a lead screw passing through a conformingly-threaded aperture in the actuator.

14. (Cancelled)

15. (Currently Amended) The pump according to claim ~~14~~ 10 wherein the actuator comprises part of a housing for the bearing assembly.

16. (Previously Presented) The pump according to claim 15 wherein the housing includes an internal pump sealing mechanism.

17. (Previously Presented) The pump according to claim 15 wherein the housing defines an end surface of the stator.

18. (Currently Amended) The pump according to claim 14 1 wherein the bearing assembly supports one end of each of the rotors, and further comprising ~~a second~~ another bearing assembly for supporting a second end of each of the rotors.

19. (Withdrawn) The pump according to claim 18 wherein the second bearing assembly is arranged to move axially with axial movement of the rotors.

20. (Withdrawn) The pump according to claim 19 wherein a housing of the second bearing assembly includes an internal pump sealing mechanism.

21. (Withdrawn) The pump according to claim 19 wherein a housing of the second bearing assembly defines an end surface of the stator.

22. (Previously Presented) The pump according to claim 9 wherein the control means comprises means for detecting the value of an operational parameter of the pump, and is configured to control the means for effecting axial movement of the rotors in response to the detected value of the operational parameter.

23. (Previously Presented) The pump according to claim 22 wherein the operational parameter comprises one of the temperature of the stator, the temperature within the stator, backpressure, the power consumption of the pump and the pressure at the inlet of the pump.

24. (Previously Presented) The pump according to claim 9 wherein the control means comprises a sensor for detecting the size of the clearance between the rotors and the stator, and is configured to control the means for effecting axial movement of the rotors in response to the detected size of the clearance.

25. (Previously Presented) The pump according to claim 9 wherein the control means comprises a sensor for detecting the rate of change of the clearance between the rotors and the stator, and is configured to control the means for effecting axial movement of the rotors in response to the detected rate.

26. (Previously Presented) The pump according to claim 24 wherein the sensor comprises a Hall effect sensor.

27. (Previously Presented) The pump according to claim 9 wherein the control means is configured to control the means for effecting axial movement of the rotors to sequentially increase and decrease the size of the clearance during use of the pump.

28. (Previously Presented) The pump according to claim 9 wherein the control means is configured to control operation of the means for effecting axial movement of the rotors such that the rate of increase of the size of the clearance is different to the rate of decrease of the size of the clearance.

29. (Currently Amended) The pump according to claim 1, wherein at least part of each rotor ~~has an outer diameter that~~ tapers in a manner where an outer diameter of the at least part of each rotor decreases ~~decreasingly~~ in a direction from a pump inlet to a pump outlet.

30. (Withdrawn) The pump according to claim 29 wherein only part of each rotor has an outer diameter that tapers towards the pump outlet.

31. (Withdrawn) The pump according to claim 1 wherein the rotors have a Roots profile.

32. (Withdrawn) The pump according to claim 1 wherein the rotors have a Northey profile.

33. (Previously Presented) The pump according to claim 1 wherein the rotors are externally threaded rotors.

34. (Withdrawn) A method of controlling operation of a pump comprising a stator housing first and second intermeshing rotors adapted for counter-rotation within the stator, the method comprising the steps of axially moving the rotors relative to the stator to increase an axial clearance between the rotors and the stator when rotors are stationary, starting rotor rotation, and axially moving the rotors relative to the stator during rotor rotation to decrease the axial clearance between the rotors and the stator.

35. (Withdrawn) The method according to claim 34 further comprising the steps of increasing and decreasing the axial clearance during use of the pump to remove deposits from the axial clearance.

36. (Withdrawn) The method according to claim 35 wherein the axial clearance is periodically increased and decreased during use of the pump.

37. (Withdrawn) A method of controlling operation of a pump comprising a stator housing first and second intermeshing rotors adapted for counter-rotation within the stator, the method comprising the steps of sequentially axially moving the rotors in opposite directions relative to the stator to periodically vary an axial clearance between the rotors and the stator to remove deposits from the axial clearance.

38. (Previously Presented) The pump according to claim 25 wherein the sensor comprises a Hall effect sensor.